PC Support Advisor

The Essential Resource for PC Support Professionals

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On This Month's Utility Disk

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Parallel port monitoring and analysis tool.

Safe directory tree deletion utility.

Graphical directory usage display utility for Windows.

"They're too big" - says Robert Schifreen.

I'm known among friends and colleagues as a big fan of WordPerfect - both the company and its products. I even use PlanPerfect as my spreadsheet - I like being able to use familiar WordPerfect command keys. Yet I haven't switched to version 6 for DOS, and I haven't used the Windows versions either. I keep them loaded on my spare machine, as they're useful for things like data file conversions. But as someone who spends around 12 hours a day in front of a computer, loading (or switching to) my repertoire of five programs around 60 times a day, I want speed and reliability and for me that means staying with WordPerfect 5.1 for DOS for most of my work.

There's another reason, too, for my refusal to upgrade. Most of the new DOS and Windows apps need at least 25 MB for a full installation, and some need twice that. I'm mean with my disk space, and no application gets to take 25 MB of it unless it can prove its worth. And most can't.

Why are today's applications so large, and so packed-full with hundreds of new features that no one uses? Because the software companies have to be able to show that they're better than their competitors. And the best way to do so is to produce brochures and adverts with tables and tick-lists to point out to potential purchasers that the competition doesn't have any of the new features that you've just put in. Of course, they don't - they have their own new features which are just as useless, yet different.

In five years, the hard disk consumption of a PC application has probably increased by an average of 1000%. It can't go on, can it? Surely Microsoft, WordPerfect and others will run out of things to put in their programs?

My opinion, and that of many experts, is that 1994 will start to see a change in the way we buy software. Buy a word processor for Windows, and you'll get the basic product relatively cheaply and at a cost of around 5 MB of hard disk space. The basic product will let you enter and format text, and print it. But if you want the fax driver, the spelling checker, the grammar checker, the layout templates and so on you'll have to pay for each module separately. What you don't need, you don't have to buy.

And if you want to buy your basic word processors from WordPerfect, your spelling checker from SpellSoft and your fax drivers from MasterFax, you'll be able to do so - that's how Windows was designed to work.

You can almost see those hard disk platters breathing a sigh of relief, can't you.

Note: If there is a specific subject that you would like PCSA to cover in a future article, please send details by fax to the Editor, Robert Schifreen, in London on +44 81 207 0195.

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How To Customise Windows Installation

Mike Lewis offers some advice on making the Windows installation and setup process less painful.

It's a support person's nightmare. Your company has dozens - maybe hundreds - of users migrating to Windows. For each of those users, you must separately install and configure a copy of Windows, select the appropriate drivers, add or remove optional components, customise Program Manager groups - and quite a lot more. Installing Windows from a file server will help, but that still leaves an awful lot of fiddling around at the workstation.

In this article, I'll describe three ways of solving the problem. The aim is to automate the entire process of installing and configuring Windows. By using the techniques described, you will be able to get a new user up and running by entering just one command at the DOS prompt. You will also eliminate the need to make decisions during the installation process, so allowing you to hand the whole job over to a less experienced person.

The techniques are valid both for installing a new copy of Windows and for upgrading from an earlier release. Although this article deals with Windows 3.1, the same principles apply to Windows for Workgroups 3.11. There are some differences in details, but these should be self-explanatory. I'll assume that you already know the mechanics of Setup (the Windows install program). If you are unsure about this, refer to the Getting Started booklet.

Overview

In summary, the three techniques I'll be explaining are:

1. Administrative setup. This involves copying the Windows files to a file server, then using those files to install Windows on each workstation. This is not the same as a network setup - you can use administrative setup to install both shared and stand-alone versions of Windows. Its main benefit is that you don't have to mindlessly feed floppy disks into the workstations.

2. Batch mode setup. Here, you create a script file which automates the install process. By eliminating the need to answer prompts, it allows you to run Setup unattended.

3. Modifying SETUP.INF. Setup uses this file to determine configuration details. By modifying it, you can customise the install process, for example, to install additional files.

The three techniques are not mutually dependent. You can use any one of them without necessarily using the others. However, you'll find that they work best when all three of them are used in concert.

Administrative Setup

When you run an administrative setup, the Windows files are copied to a shared directory on a file server. You cannot actually run Windows from that directory. Instead, you use the directory as a staging point, to install further copies of Windows on individual workstations.

To run an administrative setup, connect to the network, insert Windows Disk 1 into a floppy drive, switch to that drive, and type SETUP /A from the DOS prompt. Follow the instructions on the screen. Setup will copy all the Windows files to a shared directory on the server, expand them, and mark them as read-only.

From now on, anyone who has access to the shared directory can install a copy of Windows on his or her workstation (assuming, of course, that the relevant licensing requirements are met). The Windows distribution disks are no longer needed.

Having run an administrative setup, there are two ways of installing Windows on the workstation. You can create a shared copy of Windows, in which most of the files remain on the server. The files which the user might alter - INI files and Program Manager group files, for example - are held separately, either in a private directory or on a local drive.

Alternatively, you can set up a stand-alone version of Windows, in which all the files are held on a local drive. This reduces network traffic, and does not require the user to connect to the network simply to start Windows. The disadvantage is that it requires an additional 8 MB to 10 MB of local disk space per user.

The choice between the shared and the stand-alone options only governs the location of the Windows files. It does not affect the installation of network drivers or the user's ability to access the network.

To install a shared copy of Windows, connect to the network, switch to the shared directory, type SETUP /N from the DOS prompt, then follow the instructions on the screen. When prompted for a directory name, specify either a private directory on the server or a directory on a local drive. The rest of the process is the same as a normal Windows install, except that you don't have to worry about inserting floppy disks.

For the stand-alone option, the procedure is the same, except that you omit the /N switch. In this case, the directory you specify would normally be on a local drive. There's nothing stopping you from installing standalone Windows in a private directory on the server, but there is no good reason for doing so.

In both cases, the program prompts you to choose between express setup and custom setup. Express setup uses various default settings to install and configure the system; custom setup prompts the user for these details.

Batch Mode Setup

With batch mode setup, you supply a "system settings file", which allows Setup to run with little or no user involvement. Using this file is like running a custom setup except that, instead of prompting for choices, the program obtains them from the file. For example, if you always want to install Windows in a directory called C:\KWIN, you would specify this fact in the system settings file. The user will no longer be prompted for it.

Batch mode setup is in no way tied to administrative setup, although there are obvious benefits in using them together. In particular, you can arrange things so that, once the program has started, you can leave it to run entirely on its own.

The first step is to create the system settings file. If you have run an administrative setup, you can create the file in the shared directory. If you are installing Windows from floppy disks, you can place it on Disk 1. But these are not the only possibilities. The file can reside on any disk or in any directory which is accessible during the installation process.

To tell Setup the name and location of the settings file, use the /H: switch in the command that starts Setup. If the settings file is called KSETUP.SHH and is held in W:\KSYSTEM, you would type SETUP /H:W:\KSYSTEM\KSETUP.SHH. You can add /N to the above command to install a shared copy of Windows.

The Settings File

The system settings file is an ordinary text file, and can be created or edited with an ASCII editor. Its format is similar to that of the Windows INI files. In particular:

```
[sysinfo]

; Use this section to specify whether you want Setup to display the System
; Configuration screen. Specify "yes" to display the screen and "no" if you don't
; want the screen displayed. (The default value is "no".)
; You may want to display and review the System Configuration screen so that
; you can confirm the configuration settings before continuing with Setup.
showsysinfo=yes

[configuration]

; Use this section to specify the various devices on your system. You can find
; the values for each variable in the SETUP.INF file. If you omit an entry, Windows
; uses the detected or default device.
; If you are updating Windows, some of these entries will be ignored and Windows
; will use the devices that are already installed. If you want to force the update
; and override the installed device, precede the value with an exclamation point (!),
; for example, display = !vga. Only the Machine, Display, Mouse, and Network
; devices require an exclamation point for overriding the installed device during
; an upgrade.
; Machine profile string from [machine] section of SETUP.INF
machine = ibm_compatible
; Display profile string from [display] section of SETUP.INF
display = vga
; Mouse profile string from [pointing.device] section of SETUP.INF
mouse = ps2mouse
; Network profile string from [network] section of SETUP.INF followed by
; version profile string from the appropriate [xxxxxxx.versions] section which
; identifies the network version. The following example will setup Windows
; using "Microsoft LAN Manager version 2.0 Enhanced".
network = lanman/01020000
; Keyboard profile string from [keyboard.types] section of SETUP.INF
keyboard = t4s0enha
; Language profile string from [language] section of SETUP.INF
language = enu
; Keyboard Layout profile string from [keyboard.tables] section of SETUP.INF
kblayout = nodll

[windir]

; Use this section to specify where to put Windows files. If a previous version of
; Windows is already set up in the specified directory, Setup will update it. If you
; do not specify a directory, or if the specified directory is not valid, Setup displays a
; dialog box asking you to specify the directory in which you want to set up Windows.
c:\windows

[userinfo]

; Use this section to specify the user and company name. The first line specifies the
; user's name. This line is required. The second specifies the company name, and is
; optional. Both names can be up to 30 characters long and must be enclosed in
; double quotation marks (" ") if they include blank spaces.
; If you do not specify a user name, a dialog box appears during Setup asking
; for the user's name.
; If you are setting up Windows across a network, the [userinfo] section will be
; ignored.
"John Q. Public"              ; User Name    (30 chars MAX) (required)
"Microsoft Corporation"       ; Company Name (30 chars MAX) (optional)
[dontinstall]
; Use this section to specify components that you do not want to set up on your
; system. By default, all components will be installed. If you do not want to set
```

Figure 1 - Listing of SETUP.SHH.

- Entries are grouped in sections, each starting with a name in square brackets.
- Each entry occupies a separate line.
- Entries are not case sensitive.
- Lines beginning with a semi-colon are treated as comments.

To help you create the settings file, Microsoft have provided a template, called SETUP.SHH, which you will find on Windows Disk 1. This is not a default file; it is merely an example, with lots of comments, to help you learn the layout. You can modify it to produce your own settings file, or you can create a new file from scratch.

The contents of the SETUP.SHH are listed in Figure 1. Some of the entries cross-refer to information held in SETUP.INF and CONTROL.INF, so you might want to glance through these files too (I'll describe them in more detail later). You'll find them in the shared directory created by the administrative setup, or in the System directory in a stand-alone Windows system. All three files contain helpful comments which explain the various entries.

The Configuration Screen

One of the first actions of Setup is to detect certain configuration details, such as the display and video types. In a custom setup, the program displays these details, and asks the user either to confirm or amend them (Figure 2). In batch mode, it skips this step.

If you want to force Setup to display the configuration screen and ask the user to confirm or amend the details, add the following lines to the settings file:

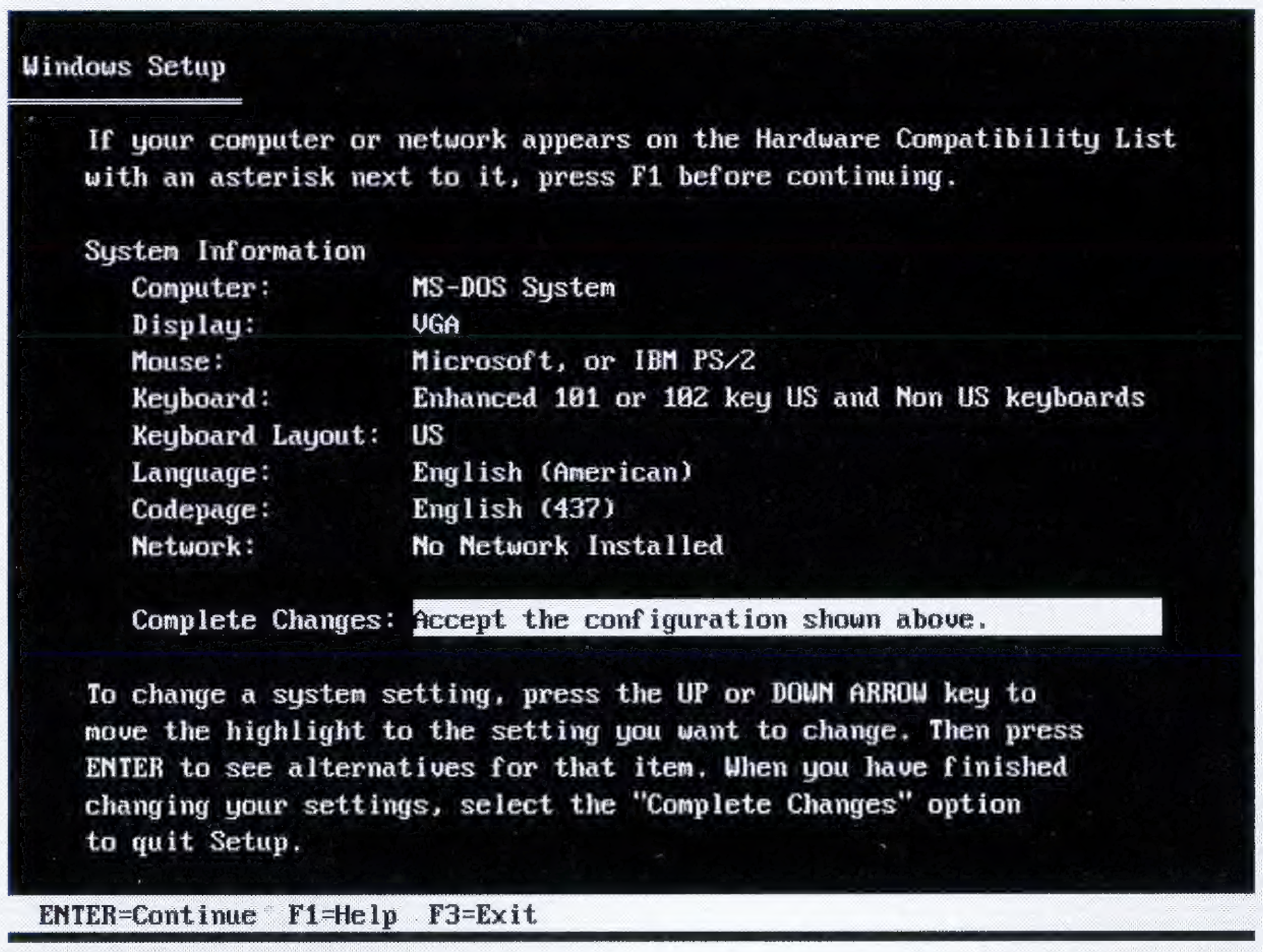
```
[sysinfo]
showsysinfo=yes
```

Selecting Drivers

Normally, you can rely on Setup to detect the configuration details and select the correct drivers. You can override its selection by adding entries to the [configuration] section of the settings file. These are equivalent to the menu choices that the user would otherwise make from the configuration screen.

```
; up a particular component, include it in this section.
accessories             ; Do NOT install accessories
readmes                 ; Do NOT install readme files
games                   ; Do NOT install games
screensavers            ; Do NOT install screen savers
bitmaps                 ; Do NOT install bitmaps

[options]

; Use this section to specify whether you want to set up *applications during Setup,
; and/or start the Windows Tutorial at the end of Setup. If you don't want any of
; these options, you can omit this section.
; If you choose to set up applications, you can either set them up interactively
; during Setup (you choose which applications you want to set up,) or you can
; specify that you want Setup to automatically set up all applications found on your
; hard disk.
; If you specify both "setupapps" and "autosetupapps", all applications on your
; hard disk will be set up.

setupapps               ; Setup applications already on hard disk
autosetupapps           ; Set up all applications on hard disk
tutorial                ; Start Windows Tutorial at the end of Setup

[printers]

; Use this section to specify any printers you want to set up. You specify a printer
; description and a port. Values for the printer description variable are listed in the
; [io.device] section of the CONTROL.INF file.
; Values for the port variable are listed in the [ports] section of the WIN.INI file.
; The printer description must be enclosed in double quotation marks (" ") if it
; contains blank spaces. The port value must appear exactly as it does in the WIN.INI
; file. If you do not want to set up a printer, omit this section.
"HP LaserJet III",LPT1:

[endinstall]

; Use this section to specify whether you want Setup to make modifications to the
; CONFIG.SYS and AUTOEXEC.BAT files and whether you want Setup to exit to
; DOS, restart Windows, or restart your system when it has finished
; installing Windows.
; The "configfiles" entry specifies whether Setup should modify the CONFIG.SYS and
; AUTOEXEC.BAT with the necessary changes, or whether Setup should save the
; proposed changes in separate files called CONFIG.WIN and AUTOEXEC.WIN in
; your WINDOWS directory. If you choose the latter, you must make the changes
; yourself.
; You can specify one of the following entries.
; configfiles = modify       ;writes modifications back to source.
; configfiles = save         ;saves changes to alternate (*.win) files.
; If  you do not specify a "configfiles" entry, the CONFIG.SYS and
; AUTOEXEC.BAT files will be modified by Setup.
; The "endopt" entry specifies what happens at the end of Setup. You can specify
; one of the following entries.
;    endopt = exit           ; Setup exits to DOS
;    endopt = restart        ; Setup restarts Windows
;    endopt = reboot         ; Setup reboots your computer
; If you do not specify an "endopt" entry, a dialog box appears at the end of Setup
; asking the user to choose from the three options.
; If you are using the network option for setting up Windows (Setup /n), the reboot
; option is not valid. Setup will exit to DOS instead of rebooting your system.
configfiles = save
endopt     = restart
```

Figure 1 - Listing of SETUP.SHH (Continued)



```
Windows Setup

    If your computer or network appears on the Hardware Compatibility List
    with an asterisk next to it, press F1 before continuing.

    System Information
       Computer:          MS-DOS System
       Display:           VGA
       Mouse:             Microsoft, or IBM PS/2
       Keyboard:          Enhanced 101 or 102 key US and Non US keyboards
       Keyboard Layout:   US
       Language:          English (American)
       Codepage:          English (437)
       Network:           No Network Installed

       Complete Changes: Accept the configuration shown above.

    To change a system setting, press the UP or DOWN ARROW key to
    move the highlight to the setting you want to change. Then press
    ENTER to see alternatives for that item. When you have finished
    changing your settings, select the "Complete Changes" option
    to quit Setup.

  ENTER=Continue  F1=Help  F3=Exit
```

Figure 2 - Use the [configuration] section in the settings file to avoid the user having to deal with the configuration screen

The [configuration] section contains entries in the form:

item=profile string

where item stands for the type of entry (see Figure 3), and profile string identifies a particular device. For example, if you want to force Setup to treat the computer as an AT&T PC with an Olivetti/AT&T monochrome display, you would add these entries:

Entry in [configuration] section	**Corresponding section in SETUP.INF**
machine	[machine]
display	[display]
mouse	[pointing.device]
network	[network]
keyboard	[keyboard.types]
language	[language]
kblayout	[keyboard.tables]

You might need to add a version number to the network name in the [configuration] section; see SETUP.SHH for details.

Figure 3 - Driver sections

```
[configuration]
machine=at_and_t
display=olibw
```

The profile strings are defined in various sections of SETUP.INF, as indicated in Figure 3. You are free to edit these SETUP.INF sections, for example to add custom drivers. Remember, Setup normally detects the correct configuration, so the [configuration] entries are not usually needed. You would normally omit the entire section.

The Windows Directory

Setup normally prompts for the name of the directory in which to install Windows, using a default supplied by SETUP.INF. To bypass this prompt, insert a [windir] section in the settings file, along with the required directory name. For example, the following entries tell Setup to install Windows in C:\KWIN, without prompting the user:

```
[windir]
c:\kwin
```

User and Company Names

When you install Windows from floppy disks, Setup prompts for the user's name and the optional company name.

You can avoid these prompts by inserting a [userinfo] section in the settings file, followed by the relevant names (in quotes). For example:

```
[userinfo]
"Jeanne Smith"
"Smith's Trading Company"
```

This means, of course, that if all users install Windows from the same settings file, each of them will have the same user name, which is probably not what you want.

Optional Components

In custom setup, the program asks the user which of the optional components (readme files, games etc.) should be installed (Figure 4). In express setup, the optional components are always installed. In batch mode, you can use the settings file to specify the optional components, thus bypassing the prompts.

To do this, add a [dontinstall] section to the settings file, listing the groups that you want to omit (see Figure 5 for a list of valid groups). For example, the following entries instruct Setup not to install the documentation files or screen savers:

```
[dontinstall]
readmes
screensavers
```

You can further customise this part of Setup by modifying SETUP.INF, as described later.

Applications And Tutorial

Setup normally offers to install Program Manager icons for the applications which it finds on the hard disk (Figure 6). It also offers to run the Windows tutorial. In batch mode, Setup skips both these steps.

If you want to force Setup to install applications, add the following entries to the settings file:

Windows Installation

```
[options]
setupapps
```

This tells Setup to prompt the user for the applications to install. To install all applications, change "setupapps" to "autosetupapps" (note that this might still require user involvement, to deal with duplicate executable file names). To force Setup to run the tutorial, add "tutorial" to this section.

To install Windows without any user interaction, omit the [options] section. You can force Setup to install Program Manager icons for specific applications by editing SETUP.INF, as described later.

Printers And Ports

In both express and custom modes, Setup invites the user to select printer drivers. You can bypass this step by specifying the required drivers in the [printers] section of the settings file. Each entry consists of the name of the driver and its corresponding port.

For example, the following entries tell Setup to install the LaserJet III driver on LPT1: and the Generic/Text Only driver on COM1:

```
[printers]
"HP LaserJet III",LPT1:
"Generic / Text Only",COM1:
```

The driver names are defined in the [io.device] section of CONTROL.INF.

If you don't want Setup to install any printers, omit the [printers] section.

Ending Setup

When it has finished installing Windows, Setup asks the user's permission to update the CONFIG.SYS and AUTOEXEC.BAT files. You can either agree to this, or tell Setup to write the changes to a separate file. If you want Setup to update the files without asking permission, add the following lines to the settings file:

```
[endinstall]
configfiles=modify
```

Finally, Setup asks how it should close down. It can either exit to DOS, exit to DOS and restart Windows, or reboot the computer. In batch mode, you probably want it to reboot the computer without asking permission. This is achieved by adding the following line to the [endinstall] section:

```
endopt=reboot
```

For the other two options, change "reboot" to "exit" or "restart" respectively.

Modifying SETUP.INF

SETUP.INF is a file which contains many of the configuration details needed by Setup. By modifying it, you can customise Setup in a variety of ways. For example, you can arrange for Setup to install custom Windows components, or to refrain from installing items that you don't want users to have.

Setup uses two further INF files. APPS.INF contains details which Setup needs when installing applications. CONTROL.INF, stores information about printer drivers and international settings. You will probably not need to edit these files.

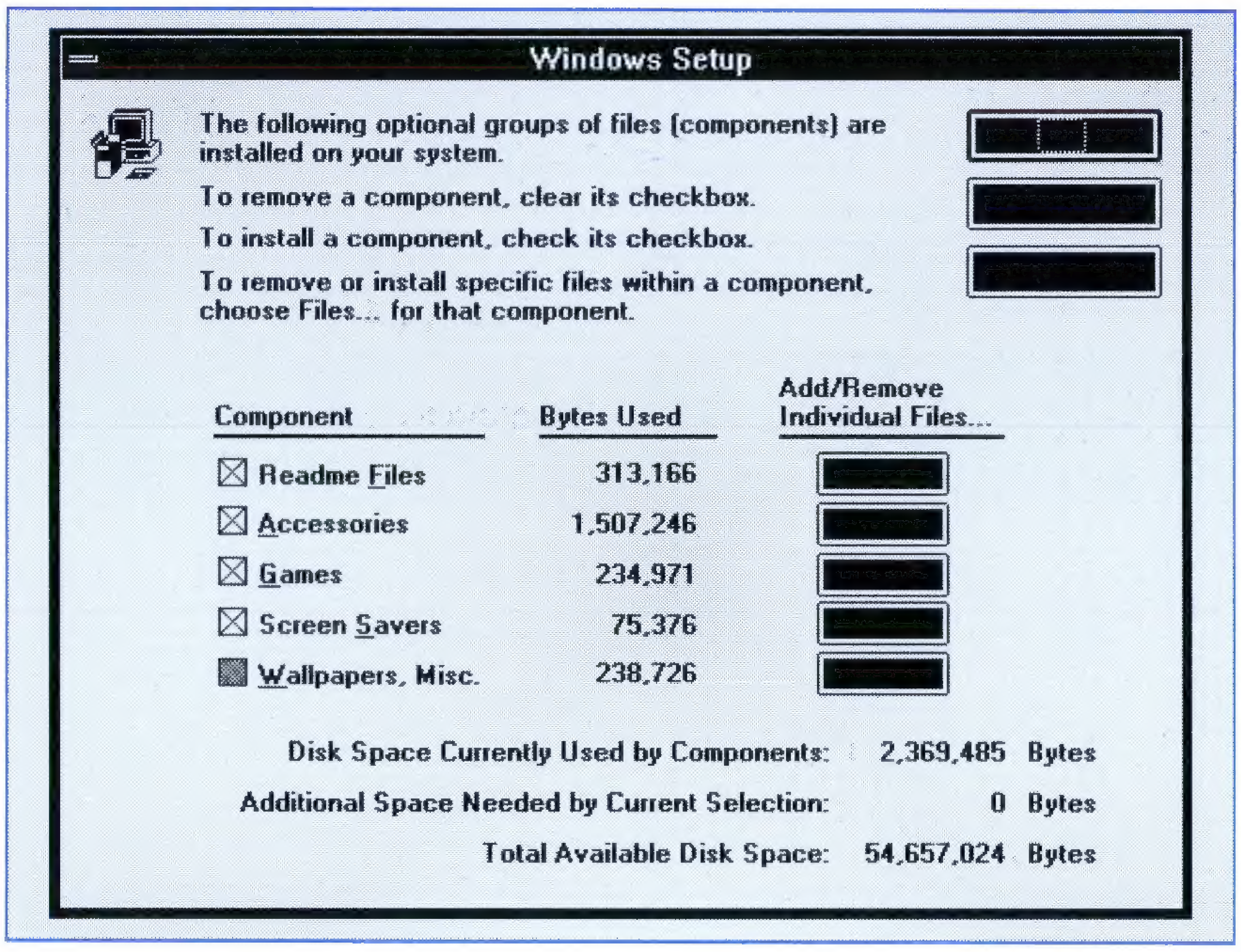
All three files can be found in the shared directory created by the administrative setup, or in the System directory in a stand-alone system. There is also a copy of SETUP.INF on Windows Disk 1. Unlike with the system settings file, these files are not examples; they are the actual files used by Setup. For this reason, you should edit them carefully, and be sure to keep backups of the originals.

The three files share the same familiar format as the INI files, with section headings in square brackets, semi-colons to delimit comments and so forth.

Disk Numbers

If you are installing Windows from floppy disks, Setup needs to know which disks hold which files. To help with this, it gives each disk a number, in the range one to nine or A to Z. These numbers are defined in the [disks] section of SETUP.INF.

If you want Setup to install addi-



The following optional groups of files (components) are installed on your system.

To remove a component, clear its checkbox.

To install a component, check its checkbox.

To remove or install specific files within a component, choose Files... for that component.

Component	Bytes Used	Add/Remove Individual Files...
☒ Readme Files	313,166	
☒ Accessories	1,507,246	
☒ Games	234,971	
☒ Screen Savers	75,376	
▨ Wallpapers, Misc.	238,726	

Disk Space Currently Used by Components: 2,369,485 Bytes

Additional Space Needed by Current Selection: 0 Bytes

Total Available Disk Space: 54,657,024 Bytes

Figure 4 - You can avoid the optional components dialogue by adding a [dontinstall] section to the settings file. To specify which files constitute each group of components, edit the corresponding sections in SETUP.INF.

tional components from disks which you supply, you can add your own entries to this section. For example:
7=.,"Fred Install Disk",fd

This identifies disk 7 as having the physical label "Fred Install Disk", and the volume name "fd". The full stop immediately after the equals sign tells Setup to look for the disk in the drive from which you are installing Windows.

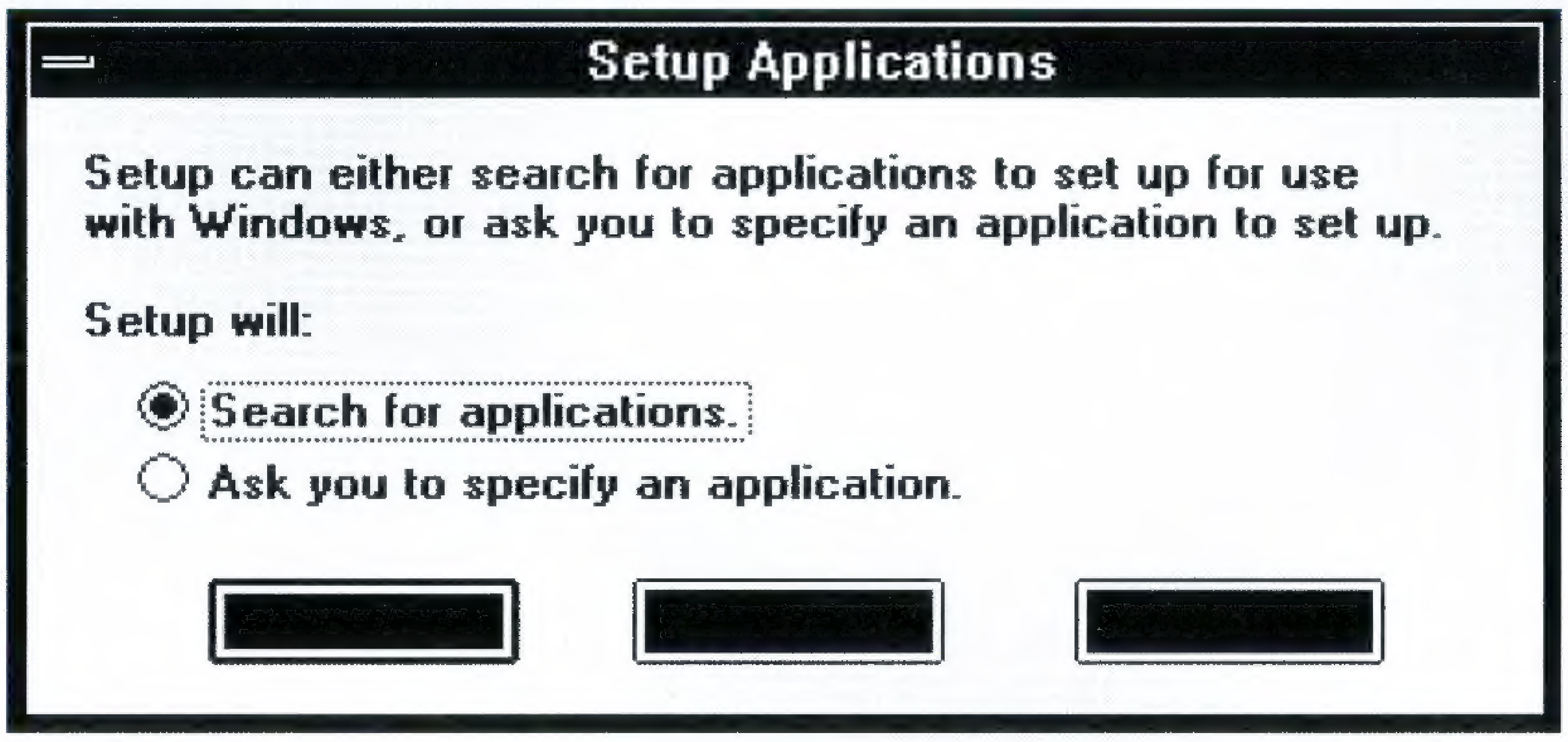
Basic File Copying

An important function of SETUP.INF is to tell Setup exactly which files to copy when installing Windows. By editing SETUP.INF, you can force Setup to omit unwanted files, or to install additional components.

Many of these files are identified in one of four "copy-file" sections, listed in Figure 7. Each entry consists of a source and a destination, separated by a comma. The source is typically the name of another section (preceded by a hash sign), which contains a list of the files to be copied. The target is "0:" to represent the Windows directory, optionally followed by a subdirectory name.

Entry in [dontinstall] section	**Corresponding section in SETUP.INF**
readmes	[win.readme]
accessories	win.apps]
games	[win.games]
screensavers	[win.scrs]
bitmaps	[win.bmps]

Figure 5 - Optional components



Setup can either search for applications to set up for use with Windows, or ask you to specify an application to set up.

Setup will:

● Search for applications.

○ Ask you to specify an application.

Figure 6 - To control the way in which Setup installs applications, edit the [options] section in the settings file.

Consider this example:

[win.copy.win386]
#win.shell, 0:
#win.other, 0:system

If you are running a stand-alone install on a 386 or better, this section tells Setup to copy the files listed in [win.shell] to the Windows directory, and those listed in [win.other] to the System directory.

If we now examine [win.shell] or [win.other], we see entries like this one:

4:PROGMAN.EXE, "Program Manager"

This tells Setup to copy PROGMAN.EXE, which is located on disk 4 (if you are running Setup from a file server, the disk number is still required but it is ignored). The file name is followed by an optional description which Setup displays during the copying.

One way of arranging for Setup to install your own components is to list the relevant file names in one of these sections. For example, if you want Setup to copy a bespoke help file called FRED.HLP from your Fred Install Disk to the Windows directory, you could add this entry to [win.shell]:

7:FRED.HLP

Similarly, if you want Setup to refrain from installing certain components, you can delete entries from these lists.

Optional Components

SETUP.INF contains five sections which list the files required by the optional Windows components. These correspond to the groups used by the [dontinstall] section in the settings file (see Figure 4). By editing these sections, you can fine-tune the choice of components, or add your own optional components. A typical entry is as follows:

[win.games]
3:SOL.EXE, "Solitaire", 180688, sol

This tells Setup to copy SOL.EXE from disk 3. "Solitaire" is the description which Setup displays in the relevant dialogue. It is followed by the size of the (expanded) file, and by a "profile string".

The file will be copied in any of the following circumstances:

- You are running an express setup.
- You are running a custom setup and you selected Solitaire (or simply Games) from the list of optional components.
- You are running Setup in batch mode and you did not include "games" in the [dontinstall] section of the settings file.

Each of the five sections is terminated by a line which indicates the total disk space occupied by the files in the section, for example:

diskspace=242008

Some of the optional components require further files, which are listed in the [win.dependents] section, for example:

pbrush=3:PBRUSH.DLL

Here, "pbrush" is the profile string for Paintbrush. If Setup installs Paintbrush, it will also copy PBRUSH.DLL from disk 3.

You are free to add you own components to any of these sections. For example, if you want Setup to install a 1024-byte document file called FRED.WRI from your Fred Install Disk, you might add the following entry to [win.readme]:

```
7:FRED.WRI, "Our documentation", 1024, fdwri
```

Similarly, if you don't want users to play Solitaire, you can remove the relevant entry from the [win.games] section. In each case, remember to adjust the disk space figure at the end of the section.

These five sections have an important advantage over the basic copy-file sections described earlier: they allow users to select the individual files to install (either during a custom setup, or by subsequently running Setup from inside Windows). In the above example, "Our documentation" will be listed in the Readme File dialogue, in the "Add/Remove Windows Components" part of Setup.

If you want users never to play games, you would delete all the entries from the [win.games] section. If you want Setup to refrain from installing games initially, but allow users to install them retrospectively, you would leave [win.games] alone, but add "games" to [dontinstall] in the settings file. If you always want a particular game to be present (that is, you want to prevent the user from using Setup to remove it), you would delete it from [win.games] and add it to one the basic copy-files sections.

Setup selects the copy-file section according to the processor type and whether it is installing a stand-alone or a shared version of Windows.

Section	**Type of install**
[win.copy]	286, stand-alone
[win.copy.net]	286, shared
[win.copy.win386]	386 or better, stand-alone
[win.copy.net.win386]	386 or better, shared

Figure 7 - Basic copy-file sections

Program Manager groups

After it has copied most of the files, Setup creates Program Manager groups, as specified in the [progman.groups] section of SETUP.INF. For example:

```
[progman.groups]
group3=Main,1
group4=Accessories
```

This creates the Main and Accessories groups respectively. The "1" after "Main" says that the group window will initially be normal size, rather than minimised. (If you are using Setup to upgrade from an earlier version of Windows, this section is called [new.groups] rather than [progman.groups], but the principle is the same.)

This section is followed by further sections which specify the items in each group. Each entry in these sections contains: the item name, as it appears within Program Manager; the executable file name; an optional icon file name; the position of the icon with the file (based on 0); and an optional profile string. Consider this example:

```
[group3]
"File Manager", WINFILE.EXE
"MS-DOS Prompt",DOSPRMPT.PIF,PROGMAN.EXE,8
...
...
[group4]
"Paintbrush",PBRUSH.EXE,,,pbrush
```

This installs File Manager and the MS-DOS Prompt in Main (group 3), and Paintbrush in Accessories (group 4). For the MS-DOS Prompt, the eighth icon stored in PROGMAN.EXE is used. The other items use the first icons in their respective EXE files.

If the profile string is present (as is the case with Paintbrush in this example), Setup only installs the item if the corresponding component has been installed. The profile strings cross-refer to the entries in the optional components sections described earlier. If there is no profile string here, the corresponding item is always installed.

You may edit these sections, either to alter the default Program Manager configuration, or to install your own groups and items. For example, to create a group containing your bespoke help and documentation files, you might add these entries:

```
[progman.groups]
..
group8="Fred Applications"
..
[group8]
"Help on Fred",FRED.HLP
"Our documentation",FRED.WRI,,,knwri
```

The help item will always be installed (because there is no profile string); the documentation will only be installed if Setup has copied the optional component whose profile string is "knwri". The icons for these items will be taken from the executable files for Help and Write respectively.

Installing Fonts

Another of Setup's tasks is to install the fonts which are distributed with Windows. SETUP.INF contains five sections which list the relevant files. For example, the [ttfonts] section lists the files for the TrueType fonts, as follows:

```
5:ARIALI.FOT, "Arial Italic (TrueType)", 5:ariali.ttf, "Arial1000"
```

This instructs Setup to copy ARIALI.FOT and ARIALI.TTF from disk 5, and to install them such that "Arial Italic (TrueType)" is the name seen by users in font menus. The final item, "Arial1000", is the font family name and an indication of the weight and slant (0000=normal, 0100=bold, 1000=italic, 1100=bold italic).

You may edit these sections if you want Setup to install third-party fonts, or to refrain from installing any of the fonts supplied with Windows.

Disk Space Checking

Before Setup starts copying files, it checks that there is enough space free on the target drive. If you substantially alter the list of files which Setup installs, you should alter the figures which Setup uses for this check.

The disk space needed depends on whether this is a new installation or an upgrade, on whether you are installing a stand-alone or a shared system, and on the workstation's processor. Each combination is represented by an entry in the [data] section of SETUP.INF. For example:

```
new286full=9000000,6500000
```

This indicates that a new, stand-alone (full) installation on a 286 needs a maximum of 9,000,000 bytes and a minimum of 6,500,000 bytes (the difference arises because of the optional components). If necessary, adjust these figures to take account of the changes you make to the files that Setup installs.

Miscellaneous Entries

If you want Setup to run a program or batch file after it has finished installing Windows, add its name to the [run] section. For example:

```
[run]
fdcopy.bat
```

To force users to install a shared copy of Windows, add this line to the [data] section:

```
NetSetup=TRUE
```

This is equivalent to typing SETUP /N from the DOS prompt.

Use the [shell] section to tell Setup to install an alternative Windows shell. For example, to make File Manager the shell, add these entries:

```
[shell]
fileman.exe
```

Further Customisation

To finish off, here are some more suggestions for customising the installation routine. To find out more about these topics, study the comments and examples in the relevant INF files.

New Printer Drivers

If you want Setup to install a printer driver which is not distributed with Windows, first add an entry to the [io.device] section of CONTROL.INF. For example:

```
8:SUPERLAS.DRV,"Super LaserPrint","DEVICESPECIFIC"
```

If the driver has supporting files, such as a help file, these must be listed in the [io.dependent] section of CONTROL.INF. For example:

```
SUPERLAS.DRV=8:SUPERLAS.HLP,
8:README.SPL
```

The driver details will appear in the relevant Setup and Control Panel dialogues. To install the driver in batch mode, add the driver name and the port to the [printers] section of the settings file, as described earlier.

Custom PIFs

Setup has access to information about a large number of popular non-Windows applications. It uses this information to create Program Information Files (PIFs), either during the initial installation of Windows, or subsequently via the Setup Applications dialogue.

The information is stored in APPS.INF. If you want Setup to install PIFs for custom non-Windows applications, you can edit APPS.INF. The layout of this information is fairly complex, so study the file carefully first.

You can also install custom PIFs via the normal copy-file sections described earlier. The advantage of using APPS.INF is that it only copies the PIF if the user elects to install the application.

Control Panel Settings

After you install Windows, you will probably want to spend some time in Control Panel, customising the desktop, colour scheme, international settings, and so on. If your users share common Control Panel settings, you can automate the process by supplying a standard WIN.INI file. [*For details of the format and content of WIN.INI, see article O0616.1 in PCSA 63 - Ed.*]

You cannot tell Setup simply to copy your standard WIN.INI to the user's directory. This is because part of Setup itself runs under Windows, and creates its own copy of WIN.INI, which would overwrite your standard version. A better solution is to write a DOS batch file to copy WIN.INI to the user's directory. You can then use the [run] section of SETUP.INF to run the batch file after Windows has been installed.

In Conclusion

The benefits of automating the Windows install routine are substantial. You will save time, reduce the risk of mistakes, remove much of the decision-making from the process, and have the opportunity of imposing a standard configuration on your users. Although the topic is a fairly complex one, it is clearly worth putting some effort into getting to grips with it.

PCSA

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How To Train PC Users

You shouldn't expect new users of PCs or software packages to instinctively understand how the thing works. But what are the best ways to train them? Peter Matthews has some advice.

Although it may not always be top of the list of things to do, user training is an important part of a PC support department's role. Even though most applications these days come with good on-line training systems, they are not as good as actually having someone teach you how to use a package simply because the on-line system can't answer questions. Moreover, a human trainer will be able to tailor the training session to better suit what that particular user wishes to use the application for. Of secondary, but still significant importance is that a well trained user is less likely to need to call the help desk to sort out a problem. This makes the support department's job easier in the long term.

This article sets out to show how to approach training users, and explains the guidelines you should follow. Before starting on this, however, do remember that not everyone can be a good trainer, just as not everyone can be a good programmer. It requires a certain temperament and degree of patience, especially if you are dealing with people who haven't had much contact with computers before. Therefore, if there are several people who could conceivably do the training, it would be worth choosing the best person to do it rather than just spreading the workload.

There is one guideline that, if you ignore all the rest, you should take to heart. The people you will be training will, almost certainly, be adults. If your only vivid experience of training is your school life, be very, very aware that the techniques and actions used to teach a class of children are not necessarily valid for training adults. You are not a teacher, you are a trainer. There is a difference.

Training sessions tend to be either one-on-one or in a group. They require different approaches, so they will be discussed separately.

One On One Training

One on one training is where you, as the trainer, have an audience of one. Typically this is a hands-on session, with you demonstrating a particular package or system to the user. One on one sessions are particularly effective as, not only can you concentrate your attention on one person, but that person finds it easier to ask questions. You can also use examples of the user's real work in the training, to help them use the application to best effect in their job.

Preparation is key to a successful training session. Make a list of the topics you need to cover, and arrange them into an order that makes most sense. For example, with a word processor you might cover the following subjects:

- Starting up.
- Creating new files and opening existing ones.
- Text formatting - selecting fonts, setting tabs and margins, underlining, centring etc..
- Cut and paste.
- Headers and footers.
- Tables.
- Checking spelling.
- Saving files.
- Printing.

If the user is already familiar with other word processors, this tutorial would probably take about 30-45 minutes depending on the person and the software package. For someone generally unfamiliar with computers it will take much longer, and may be best broken up into two lessons - basic concepts for the first one and more advanced features for the second. Take some time before the session to prepare notes for the user to keep. These notes should reiterate the points that the training session made, and if the application uses obscure function key assignments or similar, include a list of these.

In Control

For one on one training, the user him or herself should be actually controlling the computer, with you telling them what they should do to achieve a particular end. This is a subtle, but important point; the training session shouldn't be based on you simply reeling off a list of function key assignments, such as "Pressing CTRL-I will italicise the highlighted text, CTRL-B will bold it" and so on. Rather, you should take an example task - if you are training a secretary to use a word processor, use the example of creating a letter; for a research engineer, the example of a report may be more useful. You then take them through the things they should think about, and ways to achieve their ends. It can be useful to show the user some previously prepared documents (or spreadsheets, databases, drawings etc. as appropriate) to show them what can be done. Modern applications tend to be extremely powerful, but it's not always immediately obvious that there is a specific function to perform a task that the user wants. For example, you can create a table of contents by hand, but if you know how, the word processor will do it for you. You'd be surprised how many users of word processors insert page numbers manually instead of having the program take care of it.

In some respects the nitty-gritty of how to do these tasks is less important than knowing that it can be done at all.

Help Systems

Don't forget to show the user how to use the application's built-in help system. The help system built into

Windows, for example, is extremely powerful and can answer many if not all of the user's questions. By demonstrating how, for example, to search for a particular piece of information, the user feels more in control (because they can find out what they need to know) as well as having the welcome side-effect of reducing the number of calls to the help desk.

WordPerfect 5.1 for DOS has an extremely useful and easy-to-access help feature. Press the Help key (normally F3 but sometimes F1) then the initial letter of what you want to do, and the system tells you how to do it. So if you want to find out how to do bold text, set up a table of contents, or change fonts, press F3 followed by B, T or F. Version 6 for DOS has the same feature, though 5.1's is better and faster.

Location

When organising a training session, it is often tempting to do it at the user's desk. Unfortunately, this is not always a good idea. Unless the user has his or her own office, the opportunity for distractions can be too great to allow a successful training session to take place. Phone calls, people wandering over "just to ask a quick question" and so on can make a training session a waste of time for both you and the person you're attempting to teach. If the person does have his or her own office, then as long as you make sure that any telephone calls are redirected to someone else, it can be a good location. Otherwise, most companies these days have meeting rooms or similar that can be booked and provide a good means of avoiding distractions.

Allow yourself time to set up and test the computer equipment before getting the user in the room. If the support department is performing a lot of training, a special room set aside for training would be a good idea as PCs and printers can be kept in there. Make sure the room is lockable and that the equipment is clearly marked as being owned by the support department. Ensure that the PC doesn't contain any confidential data, either in visible files or in erased files that can be recovered with an UNDELETE program. Reformat the hard disk if necessary, or use something like Norton's WIPEDISK to remove old data.

Group Training

Training several people at once is never quite as effective as one on one, but if you have large numbers of users to train it is often the only feasible option. Conducting a training session to a number of people is similar in many respects to making a presentation, so the same rules should be followed. Group dynamics - how people behave when among others - is an interesting and useful area of study that it is worth having a working knowledge of.

First, try to keep the number of people being trained to as few as possible. If you have three or four people to train then you are their centre of attention; if there are eight or nine people, then their attention may start to wander after 15 or 20 minutes. In larger groups, especially where the people know each other, conversations start occurring. There are ways of reducing this; when setting out the training room, try to avoid having many rows of seats; the more people there are sitting between a particular person and the trainer, the more likely that person's attention will wander. However, you will not stop it entirely so will have to arrange ways of keeping their attention. If you are presenting an important point, immediately precede it with something that will make them focus their attention on you - move around a bit, change the tone/volume of your voice, raise a laugh (although do remember that you are there as a trainer, not a stand-up comedian. An amusing anecdote is better than "I say, I say, I say..." Also, a bad joke is worse than no joke at all so if you're no good at telling stories, don't bother), ask a question, open a window - anything short of walking round and slapping them in their faces. Once you have their attention you will keep it for at least five minutes, in which time you should have started on the important point and that will be hopefully enough to keep them interested.

The room that the training session is taking place in is also important. If it's a "hands-on" session, with a computer on each desk, it's better to put the PC on the floor and stand the monitor and keyboard on the desk. If the PC is on the desk with the monitor sitting on top, it creates more of a barrier between yourself and the person being trained. Talking of desks, it is psychologically comforting for many people if the desk has a "vanity panel" - a panel on the front of the desk that hides the legs of the person who is sitting there. If you are using tables without such panels, it may be a wise move to drape tablecloths over the front to achieve the same effect.

Putting a notepad and pen on each desk is a good idea, so that the person can make notes. Most people will probably bring their own notepad with them, but inevitably some people will either forget or assume it will be provided. If the training session is a long one, put bottles of water on the desks along with mints and/or boiled sweets. Regular coffee breaks should

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Training PC Users

be arranged, not only to keep the caffeine-addicts going but also to allow people to stretch their legs, have a cigarette and so on. Keep the breaks short enough so that people don't have time to rush to their desks and make phone calls!

If you are to have a desk at the front of the room, obviously arrange it so that you will be facing the audience. Again, avoid creating a barrier between you and the rest of the people by putting the PC on the floor if you are using one. If practical, a laptop computer is better than a normal desktop one as it is less obtrusive. Any and all equipment you will be using, such as PCs, overhead projectors, video projectors and so on should be thoroughly tested before the training session starts. If you are using a projector of some form, make sure that you know where the spare bulbs are and how to change them in case it blows.

Viruses

If you're using floppy disks during a training session, scan all the PCs before and after each session in case someone brings a virus into the room. If you don't scan, you risk spreading the virus to the rest of the company when the next trainee takes it out of the training room on their diskette.

Training Plan

The training plan for multiple-trainee sessions can be broadly similar to that for one on one training. Remember that as there are more people, there will be more questions to answer so you will be able to cover less ground than if you were conducting a one-on-one session. If the audience doesn't have PCs on their desks and you are training them to use an application, include screen shots in the presentation and, if possible, demonstrate the application in action.

Decide in advance whether you will allow people to interrupt and ask questions at any time, or whether they should wait until a break time. Try to encourage people to ask questions in front of the group, so that other people can learn from the answer, rather than cornering you by the coffee machine.

Hand-out notes are very useful, but be wary of giving the audience too much paperwork too soon. If you are giving a presentation with slides, distribute printed copies of the slides (so the audience can make notes on the copies, and can refer to the copies if they can't see the screen properly). However, if you hand out a thick transcript of the presentation with appendices of function key assignments, lists of available functions and what-have-you, the audience will tend to read the hand-outs rather than listen to you. Your presentation will then bore them because they know what you're going to say. Give out the reference material at the end of the training session, rather than before.

Where do you start?

Almost by definition, the people working in a computer support department will be familiar with PCs and the way they work. Moreover, most if not all of them will also be comfortable with computers. This is not always the case with the average user, however. Despite the fact that most businesses these days run on computers, there are still a large number of people who have had little or no contact with a PC and don't know the basic concepts of files, disks, file management, saving your work before turning a computer off and so on. Without this knowledge, the user will be floundering. The problem isn't solely software-based, either.

For an experienced computer support person it can sometimes seem a bit odd to have to show someone how to use, say, a mouse. But this can be necessary as without its use being demonstrated, the mouse is not as intuitive a device as some would have you believe. For example, the author has witnessed one user waving the mouse in the air in an attempt to get the cursor on the screen to move, and another who was holding the mouse sideways and couldn't understand why, when she moved the mouse up, the pointer moved to the right.

If you are starting from scratch, be alert for signs that the audience is not comfortable with computers. People unfamiliar with PCs tend to be afraid that if they do something wrong, they're going to break the machine. Obviously there are fragile bits (the magnetic surface of disks, for example), but you should put across the message that generally, no matter what they do they won't break the PC and that it's fine to experiment. At worst, they will need to go to a backup to get their work back and even this is unlikely.

Keep an eye out for people having difficulties with, for example, inserting a disk in the disk drive. It isn't immediately obvious which way round a disk should go into a drive (especially if the drive is mounted vertically) until you know that - at least with 3.5" drives - the back of the disk should go nearest the eject button.

Slide Presentation

A few words on creating a presentation are worthwhile here. Whether you are using a slide projector, an overhead projector with pre-drawn transparencies or a PC running a presentation program such as Harvard Graphics or Microsoft PowerPoint, the aim is the same: the slides you produce should be bold, simple and consistent. Those three words sum up the ideal of a good presentation. Any text or graphics should be easy to read, with obvious distinctions between, for example, different bars on a bar graph. If you are using colour, don't use subtle shades of the same colour to distinguish objects, use different colours altogether. Some colours should not be combined, though - red on blue is a bad combination as the eye cannot focus on a red object and a blue one at the same time. The difference in wavelength of red and blue light is enough to make one or the other appear out of focus, even if they are both the same distance away.

Incidentally, light text on a dark

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background works better in a presentation than the other way round. If you are using a graduated tint background (the most common is a medium blue at the bottom that darkens almost to black at the top) make sure that the text is still readable wherever on the tint it is placed. Detailed backgrounds are best avoided as they make it much more difficult to read any text overlaid on top.

Keep away from using red and green to distinguish items, as someone who is colour blind (this affects many men, but few women) cannot tell the difference between these two colours. (Aren't you glad you're not the person who invented traffic lights?)

The amount of information on each slide should be relatively low; if you need to give loads of facts and figures, do it on paper not on a slide. For example, a list of function key shortcuts should be printed on paper which the audience can take away with them, rather than having them note them all down off the screen. If you have more than 10-12 lines of text on any particular slide (not including the title) then you may have too many and should either consider making it into two slides or simplifying the steps.

Finally, make sure that all the slides are consistent. If you have a graduated blue background, with a title in white at the top-left above a horizontal line, make sure every slide has the same things in the same colours, same places and same fonts. If you use, say, a yellow star to highlight a particular point, don't change it half-way through to a red triangle. Trainees then get to know that they should look for yellow-starred lines and take special note. Check and double-check the spelling as mistakes give a very bad impression if you're trying to appear knowledgeable.

It is a good idea to get someone else to check the presentation you have created. They can often pick up on errors much more quickly than you can, simply because as you created it, you have an image of what it should look like rather than what it does look like.

If relevant, mark all your presentation materials with your company name and some copyright information. Also, if you're printing from a presentation graphics package, include the filename on the transparency, in small print, to help you find the file on disk if you need to reprint or amend it.

Arranging A Time

The time of day the training session takes place has an effect on how well it will be remembered. First thing in the morning is perhaps the best time as people will not only be fresh and awake, you will be less likely to be taking them away from work they are half-way through completing. Once you get close to lunch time, attention starts to reduce as they think about eating. Straight after lunch, people tend to feel a bit lethargic, but after about half an hour to an hour, the food will raise their blood-sugar levels and so wake them up. By around 4pm, the blood-sugar boost created by lunch will be in decline, which will make people feel sleepy. At around 5pm most people start thinking about going home and what they're going to be doing that evening.

However, don't think that the only time, therefore, that a successful training session can take place is between the hours of 9:30 and 10:30 in the morning; it's just that at other times the described situation will be happening and that it will have an effect on the people you are taking to. It isn't difficult to make allowances - if you have an all-day training session, present the most important things first while people are bright and awake then tail off a bit just before lunch. After lunch, start off slowly (a summary of what was covered in the morning is ideal), then once they start to perk up a bit, carry on with the major points. A coffee break at around 3 o'clock will keep them going for a bit longer, then tail off and cover any minor points that may be of interest, but isn't vital.

Conclusion

If you get it right, a training session is the best way to teach people how to use a system. Not only will they learn how the application works, but you can demonstrate how to use it to best effect to get their work done. It's no good trying to ad-lib your way through a training session, you must prepare for it. Keep that in mind, though, and it can be a particularly rewarding process.

PCSA

The Author

Peter Matthews is a journalist and PC specialist, with five years' experience of managing a PC support department at a large international company.

Understanding RSI

Repetitive Strain Injury is said to be affecting computer users worldwide. Wendy Grossman explains the symptoms and shows how to prevent PC users from suffering unduly.

In the UK last November, a judge dismissed a journalist's claim for compensation against his employer for injury caused through Repetitive Strain Injury (RSI). The judge ruled that RSI is not a medical condition and thus does not actually exist as a disease. This decision is unlikely to end the legal argument, however, in the UK and throughout the rest of the world. But, from a medical point of view rather than a legal standpoint, just what is RSI and how serious is it for ourselves and the users we're supposed to be looking after?

RSI, or Repetitive Strain Injury, is used indiscriminately to describe a variety of upper-limb disorders. Some of these, such as tenosynovitis, so-called tennis elbow, and carpal tunnel syndrome, are well established and well understood. Some users, though, experience a lot of pain without the clear medical pathology that these disorders have. This means there are no identifiable injuries or clinical symptoms that can be clearly proven to exist by an independent medical witness.

In May 1993, however, Australian researcher Professor Richard Helme of the National Research Institute of Gerontology and Geriatric Medicine reported that a sample of 83 people with RSI showed changes in the functioning of the nerve pain pathways that were consistent with changes seen in people with other types of chronic pain. This research, if extended and duplicated elsewhere, may end the present situation, where a diagnosis of RSI can be impossible to confirm or deny.

Stress

Many have suggested - usually getting an outraged reaction - that RSI might have psychological, rather than physiological causes, or, more likely, a mix of the two. Psychological stress commonly leads to tight muscles, and tight muscles are more easily injured.

In a sense, the cause doesn't matter. Those who suffer from the condition are unquestionably in pain. Recovery is generally extremely slow, and a number of those affected relapse whenever they try to resume their former activities. In May 1993, Blue Cross of California estimated that every case of RSI costs as much as $20,000 in medical treatment and lost productivity. Carpal tunnel syndrome, which may require surgery in severe cases, can cost up to $100,000. The key to avoiding this sort of expensive and disabling scenario is to act at once if even minor symptoms appear; even better, don't wait for trouble to arrive before deciding to improve the ergonomics of users' workstations and working practices.

> *"There is no single ideal position for typing, which is why it's important to have as many elements of the workstation adjustable as possible. In general, though, recommendations are to think in right-angles."*

Prevention

One reason why RSI is turning up so frequently now - 56% of the total illnesses reported to the US federal government's Occupational Safety and Health Administration in 1992 were RSI cases - is that PCs have invaded the working environment without any clear planning for their use.

Members of the typing pool had specially designed chairs with adjustable seats and supporting backs, and tables of exactly the right height for comfortable typing. Today's non-stop PC typist could be anyone in the company, and typically their desks and chairs were designed for writing at.

Choosing A Position

There is no single ideal position for typing, which is why it's important to have as many elements of the workstation adjustable as possible. In general, though, recommendations are to think in right-angles: feet flat on the floor, thighs horizontal, back upright and supported, forearms horizontal, and wrists up so that fingers drop onto the keyboard. Look at a concert pianist, and you'll see the right sort of posture, especially in the way the hands are held over the keyboard.

Most standard desks, at 27 inches, are too high to accommodate this sort of position. Most people begin by raising the height of the chair. That's fine but it's important then to give a foot rest to any user whose feet don't touch the floor, since that's an easy way to lower-back problems. The chair itself should have a separately adjustable

> *"Many RSI sufferers say that their problems first started with pain, stiffness and tension in their shoulders and upper back. Poor posture and overall fitness contribute to this, as does the positioning of many monitors."*

back with good lumbar support, and if it has arms these should be padded.

Keyboard Support

One alternative to raising the height of the chair is to install a keyboard drawer at the front of the desk. However, this poses a new problem for mouse users, who may have to stretch and strain to reach the mouse, which is typically still on the desk. A simple solution for wooden desks is to saw a couple of inches off the bottom of each leg.

Many RSI sufferers say that their problems first started with pain, stiffness and tension in their shoulders and upper back. Poor posture and overall fitness contribute to this, as does the positioning of many monitors. People often like to stick their monitors in a corner of their desk at an angle to clear more space, but over many hours of use this can give you a stiff neck.

Most monitors, too, are set too high: despite the popularity of the monitor-on-CPU setup, the top of the monitor should be at or very slightly lower than eye level and at a distance of one and a half to two feet. This helps avoid eyestrain as well as neck and upper-back pain.

Other elements of the workstation aren't specifically RSI-related but contribute to the general stress level of the working environment. Screens should be placed so that they are free from glare - don't, for example, set a monitor in front of a window so that daylight spills onto it. Overhead fluorescent lighting is a problem here, too: it can completely wash out the screen. Turning off a couple of those lights and adding an adjustable desk lamp can help a lot.

Day Plans

The most important recommendation, however, is to organize the working day so that users can take frequent breaks from repetitive typing. Indeed, in some countries, workers are legally entitled to a certain number of minutes away from the screen in every hour.

In the days of ordinary typewriters, typists had such breaks built in - they had to change pages and shuffle carbons, pause to return the carriage, get up to file and retrieve copies and so on. Today's PC user is much more sedentary and works much more intensively. Job insecurity and required productivity levels - in some cases automatically measured by the

RSI Data On The Internet

A lot of information about RSI and other computer-related occupational hazards is stored around the Internet and on other online services, and outside of national or regional RSI associations, these are probably the best resource available.

Any email user with Internet connections can subscribe to any of several mailing lists; essentially, you send a message to the computer that manages the list, and it thereafter sends you the messages posted to the list. Some lists will put a dozen messages in your mailbox every day, while some may not bother you for weeks on end.

To subscribe to the Sorehand mailing list, send a message to LISTSERV@VM.UCSF.EDU which says SUBSCRIBE SOREHAND <YOUR FULL NAME> in the body of the message. To subscribe to the C+HEALTH list, use the same format to send a message to LISTSERV@IUBVM.UCS.INDIANA.EDU.

Alternatively, search using the keyword RSI from any Gopher, Archie, or Veronica server - the results should direct you to any one of several sites that store electronic versions of the RSI Newsletter and other files. The Newsletter is also available in printed form from its publisher, Caroline Rose, 970 Paradise Way, Palo Alto, CA 94036, USA. Her email address is crose@applelink.apple.com.

You'll also find useful information stored at several sites, such as MIT (Telnet techinfo.mit.edu). An archive site has been set up at Berkeley specifically for RSI-related information and files (ftp to soda.berkeley.edu and look in the pub/typing-injury directory).

It's also worth looking on CompuServe: health and safety issues are discussed in the Health and Fitness forum. Health Database Plus indexes a variety of health and general interest magazines. Medline (GO PAPERCHASE) gives a useful, though expensive, index to medical research papers.

In addition, almost any local online service is likely to have some kind of conference or other forum on the subject of RSI.

Understanding RSI

> *"Windows by default makes the background of all active windows brilliant white; looking at this all day is in itself tiring for many users. This is easily changed via the Control Panel - one likely substitute is the pale grey-green colour."*

number of keystrokes per hour - add to the general pressure and tension level.

Regular breaks of 10 minutes per hour are recommended. These don't necessarily have to be complete breaks from work, although a number of ergonomists recommend exercises to relax the hands, arms, and shoulders. At the minimum, users should change tasks: perhaps that's a good time to make a few phone calls, get up to go to the photocopier, or confer with a colleague.

These breaks can be difficult for users who like work on one thing intensively until it's finished, but in the long run it's healthier - many RSI sufferers report that it was a single burst of intensive work at all hours racing to meet a deadline that pushed them over the edge into requiring medical treatment. These are overuse injuries, just like the ones athletes get who aren't fit enough or who haven't warmed up or built up their fitness carefully enough.

It's important to remember that the key is adjustability: giving staff some flexibility and control over their workstations and working lives goes a long way to reducing the stress levels that everyone agrees contribute to RSI. No single solution will be perfect for everyone.

Windows Users

It hasn't been written about nearly as much, but Windows users have an extra set of problems. First of all there's the mouse. Unlike a keyboard, which distributes the workload more or less evenly between hands, the mouse dumps the entire load on one hand. Most of us did some typing or piano playing before we moved onto a PC keyboard; mice are newcomers, and most people's muscles don't get enough time to adjust. Users should avoid moving straight into intensive hours of mouse work: move into it gradually.

Current mouse design is very stressful. Fingers are held, tensed, over the buttons, which may be stiff or difficult to press. The mouse itself can press against the nerves in the outer palm of the hand, causing pain and numbness. All this can be balanced to some extent by switching hands - it's easy to swap the buttons over in Windows's Control Panel. This evens the strain.

Alternatively, consider other pointing devices (see below), set up a macro or batch system to automate common tasks, or use keyboard shortcuts.

Displays

Displays are also a special problem for Windows users. There's a lot of graphic information on a Windows screen, and many Windows applications are specifically graphical, like desktop publishing, presentation graphics, and drawing and painting programs. The result is that Windows users tend to stare rigidly at the screen. This is especially true of users who like to run at higher resolutions because of the increased amount you can get on a screen but have only a standard 14" monitor: all those tiny, little characters.

Windows by default makes the background of all active windows brilliant white; looking at this all day is in itself tiring for many users. This is easily changed via the Control Panel - one likely substitute is the pale grey-green colour, which is very similar to the colour used in ledgers to reduce eyestrain.

Products

There are a number of products that can help avoid or recover from RSI, many of them inexpensive. Wrist rests are a common addition to a workstation, and these can cost as little as $10. These help users remember to keep their wrists up while typing, and also

Hints And Tips

Pay attention to warning signs: pain and/or tightness in the upper back, shoulders, or neck; numbness, tingling, or pain when typing.

Take regular breaks; exercise if possible to improve general fitness and relieve tension. Organize the distribution of work to accommodate this or provide regular changes of activity.

Change your field of focus to prevent eyestrain: don't stare continuously at the screen, but give your eyes regular breaks by looking out a window or across the office. Keep the screen free of dust, grime, and glare.

If a doctor is consulted on RSI, be sure to choose one who is experienced in the field. It does not help users to be told that it's all in their minds.

Make workstations as flexible as possible with as many independently adjustable elements as possible. Long hours in the same cramped posture aren't comfortable for anyone: think of airline seats.

> *"There are a number of alternatives for people who are having trouble with mice. It helps if the mouse is a comfortable size for the user - Logitech's Mouseman comes in a number of sizes and both right- and left-handed versions."*

give them a padded place to rest their hands while thinking or waiting - resting them on the relatively sharp, hard corner of the desk can contribute to carpal tunnel syndrome.

There are also some keyboard alternatives. Some, like the Dvorak keyboard, have a different layout than the more common QWERTY and thus stress the hands differently. Others, such as the Maltron keyboard, handmade in a garage in England, are relatively expensive (about $500) but change completely the angle at which users hold their hands.

There can even be benefits in swapping among standard keyboards. There have been reports of some problems with certain so-called "positive action" keyboards. On these devices, it takes more force to make the key travel the first short distance than it does to make the key travel the rest of the way. The result is that users' fingertips tend to thump against the keyboard base, causing problems over time. Softer keyboards, or keyboards with springier action may be preferable. Some users benefit, also, from putting one of those foam typing pads under the keyboard to deaden vibration; these have the advantage of being cheap.

Several utility programs are available, either commercially or as Shareware, that put up reminders when it's time to take a break. PC Write, a Shareware word processor, has such a facility built in.

It also helps to teach users how to take advantage of the macro features built into Windows (the Recorder) and both DOS and Windows applications to automate routine tasks. Most users have to do at least some repetitive typing; it makes sense to eliminate that, since it will save both their hands and company time and errors. If enough users have to key in existing documents, a shared scanner and some OCR software might help.

There are a number of alternatives for people who are having trouble with mice. It helps if the mouse is a comfortable size for the user - Logitech's Mouseman comes in a number of sizes and both right- and left-handed versions. The older Microsoft Mouse has a nimble design comfortable for smaller hands and easy-action buttons, while the Mouse II has a rounded shape. Despite Microsoft's claims, however, the Mouse II is not comfortable for most left-handed users.

Trackballs

Some users may benefit from switching to a trackball, which stresses different muscles. A couple of companies make trackballs with foot pedals instead of buttons. There are also other types of pointing devices. Tablets with either pens or pucks are probably the best known, but also available are more eccentric devices like the Unmouse, which has a glass tablet that you push on with a finger, or pen-styled mice. Touch screens are rather expensive - about $400 for a 13" to 15" monitor - but are another alternative.

Even more expensive are speech recognition systems. IBM Voice Type and Dragon Type, which the two companies co-developed, offer voice navigation through system menus. The more advanced system Dragon Dictate uses a combination of a specialist processor board and software to take dictation.

Users have to spend some time training the system - you have to read it a set passage - and getting used to speaking with the split-second pauses between words that the system requires, but once it's installed it's very impressive. The system includes the voice equivalent of keyboard macros and for some users may work out as fast as typing.

Reflections

Newer monitors come with anti-reflective coatings that help to reduce problems with glare. Older monitors can be helped somewhat by fitting anti-glare screens, but at the price of diminishing the screen's brightness. Some jurisdictions have passed or are passing laws requiring employers to provide regular eye tests for staff using VDT equipment.

One product that is falling out of favour is the monitor arm, which clears the monitor off the desk. Most of these position the monitor too high or at an angle.

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Understanding Macintosh SCSI

Steve Cassidy outlines the features of the Macintosh's SCSI system and explains the differences between SCSI on a Mac and a PC.

This article takes a look at managing, rescuing and configuring hard disks for the Macintosh range of computers. It's designed for PC support professionals who know their way around the MS-DOS architecture but who have been landed with a Mac user who needs help.

Macs And Hard Disks

A hard disk interface is one thing the Macintosh wasn't born with. The very earliest models - the 128 and 512 - were floppy disk only, unless you splashed out on one of the strange devices which patched huge external disks into the floppy disk port. It wasn't until the introduction of the Mac Plus that a proper hard disk interface was provided. The Mac Plus, like the preceding models, was famous for its novel software and diminutive size - the chances of fitting a hard disk inside that case, given the range of mechanisms available in 1985, was minimal.

So it was that the SCSI device I/O bus appeared as a 25-way plug on the back of the Plus, setting in place a standard which has persisted right the way through to the current range of machines.

SCSI is a general purpose, high speed parallel interface, not specific to the task of connecting hard disks to CPUs. The first thing for a PC experienced person to notice is that the SCSI bus comes out of the back of the Macintosh via exactly the same kind of 25-pin D connector as is used for the PC's Centronics printer connection; it will not do the Macintosh any good at all to connect it via this to a PC printer - the two are entirely incompatible.

A computer equipped with SCSI can use up to six peripherals connected via the SCSI port. Each is daisy-chained to the next. Thus a command for, say, the fourth device in the chain, passes through the first three devices. The fourth device recognises the command because the command will contain a device ID.

There are in fact seven device IDs on SCSI, but the computer itself counts as one (always device 7 in the case of Macs). Some other implementations of SCSI make use of the LUN (Logical Unit Number) feature, in which each SCSI device can have Logical Units within it (numbered 0 or 1) - but I've not yet seen any Apple compatible device which uses this feature.

When you buy a SCSI device, you'll need to set the device ID to the next available number in the sequence, depending on the length of the chain to which you're attaching the device.

> *"A hard disk interface is one thing the Macintosh wasn't born with. The very earliest models - the 128 and 512 - were floppy disk only, unless you splashed out on one of the strange devices which patched huge external disks into the floppy disk port."*

Cables

A SCSI cable is distinguishable from a PC Centronics cable by the width of the "toothier" end - it looks the same as the Centronics connector, only wider.

Macintoshes are connected to SCSI disks in two ways: via an internal ribbon cable in machines later than the Plus, and also by the external port on everything later than a 512. Once outside the case, on any model, only the first external device is attached by an asymmetric cable; even Apple's own-brand peripherals change over from the 25-way D connector to using the wider Centronics "Harmonica" for both ends.

It's almost inevitable that any meeting of persons with external disks will include several minutes of frustration at not having a "device to device" (sometimes known as an "extension") cable for daisy-chaining drives and other peripherals together.

These cables can be bought in lengths up to three metres (9.75 feet). SCSI may just be able to drive a single three metre cable without data error, but I'd not want to rely on the integrity of any files I copied over such a long cable run in a real world installation: usually, subtle errors start to creep into the data transfer, manifesting as plaintive Finder "An error occurred while copying..." messages. In practice, one should never be happy with SCSI cables much over 18 inches long, without taking steps to minimise interference and doing regular tests for the insidious introduction of transmission errors: it's best to think of external SCSI cables as a bus which really should have stayed inside the casing if at all possible.

"Macintoshes are connected to SCSI disks in two ways: via an internal ribbon cable in machines later than the Plus, and also by the external port on everything later than a 512."

This sounds terribly depressing, in a world of kilometre-long network connections and globe-spanning ISDN lines - but it should be remembered that SCSI is a very high speed parallel data bus: burst rates in the region of 2 MB/sec are not unknown. It does explain why you're most unlikely to see Macintosh installations with hardware components spread widely about an office, though.

Unlike the familiar PC, all Macintoshes with SCSI implement it directly on the motherboard; it's only the still faster SCSI-II standard which comes as plug-in NuBus cards with the appropriate DMA access modes. For the moment, though, there's enough to be said about the normal onboard standard - SCSI-II implementations vary from one third party board supplier to another, so we will leave those for a later article.

Disk Sizes

From a data storage point of view, the Macintosh can make use of disks of up to 2 GB, a distant limitation in the far off days of 1985, but now a reality.

"Plugging extra external disks in is just a matter of connecting them with the appropriate lead and making sure their power supplies are turned on at boot time; handily, any extra drives show up on the desktop just like inserted floppies."

In theory it is feasible to have a 2 GB mechanism on all six SCSI device IDs, delivering 12 GB of storage. However, there are reports of problems with some combinations of drive mechanism, SCSI driver and partitioning and later versions of AppleShare, Apple's own file server operating system add-on. The moral of such stories is that any such proposed specification be tested extensively before running in a live environment.

Drivers And Partitions

So, you're looking at a Macintosh with a hard disk. It seems to boot from the disk as soon as it's switched on, just like a PC would, and it will boot from the right sort of floppy instead if one is present at startup; this all looks pretty familiar.

Plugging extra external disks in is just a matter of connecting them with the appropriate lead and making sure their power supplies are turned on at boot time; handily, any extra drives show up on the desktop just like inserted floppies do, as further icons beneath the boot device's icon. Given a well-behaved Macintosh, it's even possible to plug drives in after boot and use any one of several third-party Control Panel gadgets to re-scan the SCSI bus for new volumes.

Mac Disk Problems

First, let's look at the daisy-chain. However, the definition of "a well behaved Macintosh" needs some careful study, for not all Macintoshes are well behaved.

It's quite possible to crash the machine or even damage the SCSI interface by plugging in an unwelcome visitor - the most simple crashes are caused by adding a device whose SCSI ID number matches one of an existing device in the chain: external drive units tend to select their device IDs by a small push-button wheel on the back of the case.

Cheap drives, and internal units, use a set of jumper pins - the push button wheels are normally wired through to a six-terminal connector block which sits on top of this block of jumpers. Drive ID numbers are distinct from the name of the volume found at the ID number, and no bits of software the user sees is ever worried about a physical device ID - they're just there so that users can mix and match devices.

Which brings us to the subject of termination. An Apple terminator is a fat plug with SCSI connectors on either side, coloured grey or black. In theory, every SCSI chain should have a Terminator; some devices, like various of the simpler and cheaper third-party CD-ROM players, incorporate their own terminators and leave out the pass-through connector.

Macintosh SCSI

> *"It's quite possible to crash the machine or even damage the SCSI interface by plugging in an unwelcome visitor - the most simple crashes are caused by adding a device whose SCSI ID number matches one of an existing device in the chain"*

In practice, though, a terminator is rather like a SCSI extension lead - 90% of the time, you don't need one. Until you come to do something out of the ordinary.

A Terminator is more properly referred to as a Terminating Resistor pack, and both ends of a SCSI chain need to be terminated. The head end - the CPU - is of course supplied with resistors, and since their purpose is to cut down on reflected signals these are often all that is required to adequately quieten down simple configurations. However, a few circumstances demand the presence of terminators: an Apple peripheral which sticks rigidly to the standards (such as a Scanner or, in some combinations, older Apple badged external drives), a drive setup of otherwise happily operating drives and devices which suddenly won't work together, or the use of a Mac IIfx.

The fx is the odd man out of the Macintosh range in many ways; it combined the largest ever desktop case with a rapidly clocked processor - a 40 MHz 68030 - and a novel set of chips around the CPU, designed to relieve it of the loads which the Macintosh design normally leaves firmly with the CPU.

Custom auxiliary processors, not present on other models, take care of networking, mouse and keyboard reading, and SCSI I/O. The design didn't last long, and despite little quirks like grumpy incompatibility with various important third party expansion boards and rare and unusual memory boards, is still to be found even today.

The general rule with the IIfx is that you should approach any activity relating to plugging in external SCSI devices with particular caution, equipping yourself with a grey and a black Terminator and sticking rigidly to the rules regarding powering the machine off completely before disturbing any existing connections or adding any further drives. Replacement IIfx motherboards are neither cheap nor plentiful.

The difference between a grey and a black terminator is in resistance; two grey terminators piggy-backed together are equivalent to one black. More than 90% of all the Mac installations I have seen which include terminators used the grey terminator.

Formatting Software

Since SCSI is a data bus standard, the procedures for managing formatting of disks are not inherent in the controller, as used to be the case on PCs before the days of IDE (and PC SCSI).

Apple supplies the HD SC Setup and Disk Tools programs, generally on a bootable floppy, so that really bare systems can be started up and hard disks initialised.

All Macintosh disks have at least two partitions; one is the disk driver, generally only a few KB - a very low level program which is loaded into the Mac as soon as the drive is visible on the bus, and which acts as a device driver specific to the SCSI device ID owned by the drive in question. All accesses to the physical disk and any logical partitions are done via this driver code.

The second partition is defined by the disk partitioning routine of the particular SCSI formatting and management software recommended for use with the drive type you're using.

There are a number of third-party disk managers, which compete with Apple's proprietary tools They take advantage of the fact that the Apple utilities will properly control only drives from a limited range of suppliers, fitted with ROMs approved by Apple.

FWB's Hammer utilities are bundled with their range of external drive mechanisms, and are highly rated for the wide range of high performance drives they support. In general, when you buy either an internal mechanism or an external cased drive, the vendor will bundle formatting and management software with the unit, if it's required: if they don't know whether their drive requires these utilities, consider changing your supplier.

Bootable Devices

Any drive in the device chain can be declared to be bootable: all that is required is the presence of a valid System Folder on the drive. When a Macintosh starts up, it reads through the device chain in descending order of device ID, looking for a System Folder - when it finds one, the machine boots from there. Notice that the internal drive is SCSI device 0 and, therefore, always comes off worst in this situation - unless the user has chosen to use the Startup Device Control Panel.

Startup Device is a regular Control Panel, which lists the currently mounted drives and allows the user to click on one of them to nominate it as the one read at boot time. The name of the volume chosen as Startup Device is stored in the Macintosh's battery backed parameter RAM, and is consulted by the ROM startup routines before the SCSI chain is walked as I have described above. It is quite possible to become stuck up a gum tree by nominating the current internal disk as the Startup Device, then take it out in the course of an upgrade - the Mac will then not boot until a floppy is put in a drive, even if the former internal disk is dropped into an external case and attached by way of the external drive port. It's possible to nominate no drive as the Startup Device - a strategy I heartily commend.

Free Space

A grab-bag of final drive tips. Apple's normal suppliers of internal drive mechanisms often could not meet the exact specifications set by Apple for their standard systems - the most common of these is the Quantum 84 MB drive mechanism often found inside late model machines, badged as having 80 MB disks.

Rather than have catfights between users who get 84 MB units and whose neighbour may have a dead-on 80 MB drive from another batch, Apple's default formatting for these is to have an 80 MB partition, and leave the remainder of the disk unused. It pays to have a look inside your Mac at the sticker on the drive, to see if you can find some more room for free - you'll have to reformat and repartition the disk, but it's space for nothing.

Lubrication

A large batch of 20 MB drives for Mac SEs were delivered with somewhat substandard lubrication for the read/write head moving mechanism. Fixing this was a matter of screaming and shouting at the supplier, or patching the disk access routines to make the drive "waggle" the read/write head every so often. Apple chose to patch the disk access routines - even if you have replaced the drive unit itself, some of these more antiquated models may still "waggle" their drives.

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Exchanging Files Between Macs And PCs

One of the major boasts that Apple makes in its Mac advertising is that Macs can share data with IBM-compatible PCs. Although the process is not quite as straightforward as Apple would have you believe, there's no need to assume that a data file saved on a Mac's hard disk can never be used on PCs, or vice versa.

One thing worth nothing first, incidentally, is the ease in which external disk drives can be attached to a Mac. Just plug the external drive into the mains, connect it to a Mac via a SCSI lead, power everything up, and the external drive appears on the Mac's desktop. This makes it ever so simple to, for example, take a large external drive around a handful of Macs and back them up, one at a time. It also means that bulk-copying files from one Mac to another becomes easy.

When you're looking to share data between a Mac and a PC, there are two things to consider, namely the file format and the disk format.

File Formats

The format in which an application stores information in its data files will affect whether or not you can use that information on a different machine once you have converted the disk. WordPerfect, for example, uses the same document format in all its products so you can easily take a file produced on the Mac version and, once you get it onto a PC disk (see below), read it into WordPerfect on a PC. Some applications aren't so friendly, and you'll need a conversion utility.

Disk Formats

The Mac and the PC use different disk formats. Put a Mac disk into a PC, or vice versa, and you'll get nothing but an error message.

For full information on Mac-PC connectivity, see article C0803.1 from page 17 of PCSA Issue 57. However, there are two relatively simple ways of solving the problem. For reading a Mac disk in a PC drive, there's a Shareware program called MACSEE. The unregistered version, downloadable from any bulletin board, will handle files up to 16 KB in length. Once you register, the full version handles any length of file. (You'll need a 1.4 MB drive in each machine to be able to use MACSEE).

To do things the other way round, ie to read PC disks on a Mac, the easiest program to use is PC Exchange, from Apple. This is bundled with some Macs, but it's an optional extra with others. Install PC Exchange and then the whole PC-Mac problem goes away. Stick a PC (1.44 MB) disk in the Mac drive and it appears as a standard disk icon on the Mac desktop, and you can copy files to and from it. The disk will remain readable by the PC, too. PC Exchange won't do any data file conversion, so as a last resort you'll have to read in word processing documents as plain text files and spreadsheets/databases as ASCII comma-separated files. But PC Exchange does mean that, once you have exported the data into a file format that both applications can understand, copying it between machines becomes a piece of cake.

The Author

Steve Cassidy works in the support department of a large international financial company, looking after many hundreds of Macs and PCs.

Articles on understanding PC SCSI and installing SCSI devices on DOS PCs are currently being prepared for publication in future issues of PCSA.

Troubleshooting OS/2 For Windows

IBM has recently released OS/2 for Windows, a version of OS/2 2.1 that lacks the built-in copy of Windows. We present some advice for tuning this latest IBM software product.

What is OS/2 for Windows and why should I get it instead of OS/2 2.1?

OS/2 for Windows is just a repackaged copy of OS/2, without the Windows application support built in. It uses your existing copy of Windows 3.1 to run Windows applications.

OS/2 for Windows is designed for the users of DOS and Windows who would like:

1. A lower-cost upgrade to OS/2
2. To still be able to run their DOS and Windows applications under either OS/2 or DOS and Windows, retaining their current copy and configuration of Windows 3.1
3. To do all this in less disk space then having a full copy of OS/2 and Windows on the hard disk.

Be aware, however, that there is no guarantee of IBM upgrading OS/2 for Windows to take account of future releases of Windows or OS/2. The current version of OS/2 for Windows works only with Windows 3.1, not Windows for Workgroups or any other version. If you have non-standard drivers or other Windows components, it's advisable to check that OS/2 for Windows will work with your systems.

Can OS/2 for Windows be set up for HPFS only?

To enable Windows application support under OS/2 for Windows, real Microsoft Windows 3.1 must be installed. Windows 3.1 will not install under OS/2, only DOS. Since DOS cannot see or access HPFS drives, the problem is how to get Windows 3.1 on an HPFS drive. [*Note: Although there is no official way for DOS to read HPFS drives, there are two Shareware utilities that claim to provide such functionality. These programs are included on the PCNA 64 Utility Disk for you to try on your system - Ed.*]

The only solution is to install DOS and Windows, back up the Windows code to diskettes, install OS/2 for Windows, then restore the Windows code from diskettes, then use selective install from OS/2 to add the Windows application support.

To do this, proceed as follows:

1. Make sure your system has DOS and Windows 3.1 on it.
2. Back up to diskette the subdirectory(ies) that contain the Windows code only. There is no need to back up the DOS code, since you will not need it in this all-HPFS configuration.
3. Install OS/2 for Windows, choosing to reformat the partition with HPFS.
4. Create the appropriate directory on the target drive, and restore the Windows 3.1 code from diskettes.
5. Open the OS/2 System folder, then the System Setup folder, and start Selective Install.
6. Follow the steps to install Windows application support.

OS/2 has been installed. After rebooting the system, the mouse does not work. When booting to DOS, the mouse works fine.

Sometimes if there is a DOS-based mouse device driver installed, the OS/2 mouse device driver does not get copied over. The solution is to unpack and copy over the OS/2 mouse device driver. To do this:

1. The OS/2 mouse device driver can be found on diskette 1 of the installation package. Copy the file MOUSE.SYS from the diskette to the \OS2 directory on the boot drive.
2. The line containing MOUSE.SYS should be in the OS/2 CONFIG.-SYS file. In any case, you will need to reboot the system for the device driver change to take effect. If it is not, use selective install to reinstall the mouse device driver support. To do this:
   a. Open the OS/2 System folder, then the System Setup folder, then open the Selective Install item.
   b. The first screen will indicate mouse support. Select the one appropriate for the user's hardware and select the OK pushbutton, then select the Install pushbutton and let the mouse device support reinstall itself.
   c. You must reboot the system for this change to take effect.

How can I set up my OS/2 for Windows system for OS/2 only, with no DOS and Windows? I want to install OS/2 for Windows, but remove DOS from the system and just run OS/2 and Windows 3.1 applications.

The solution is to install OS/2 for Windows, then remove DOS and its related files from the hard disk. Assuming you have DOS and Windows 3.1 installed, install OS/2 for Windows, choosing the options you wish, and choosing to NOT reformat the partition.

When you are finished, you will have a system that boots DOS as well as OS/2. Make sure you are booted to OS/2.

> *"OS/2 for Windows is just a repackaged copy of OS/2, without the Windows application support built in."*

Now, in the OS/2 subdirectory, there is a file called BOOT.COM. Delete it. You have now just removed the ability to boot back to DOS. If you want to retain the ability to re-enable it, you can rename the file to something like BOOT.BAK. If you truly do not ever want to boot this machine to DOS again, you can remove the \DOS subdirectory and the CONFIG.DOS files from your system.

Can I use the High Performance File System (HPFS) with OS/2 for Windows?

In general, OS/2 for Windows systems are designed to be dual boot systems, allowing you to boot both DOS and OS/2 from the same partition. In fact, this is how the default installation prepares the system. Since DOS cannot access HPFS drives, the boot drive will remain a FAT formatted drive.

However, this does not preclude you from formatting other HPFS drives on the system. But be aware that when they are booted under DOS, those HPFS formatted partitions will not be visible.

The steps involved are:

1. Install OS/2 for Windows. In the selection panels, choose to install HPFS support.
2. For any drives to be formatted as HPFS, issue the command:

   ```
   FORMAT X: /fs:HPFS
   ```

   where X is the drive to be formatted.

I'd like to use OS/2 for Windows, but I don't have Windows 3.1. Can I still install and use OS/2 for Windows, although obviously without the ability to run Windows applications?

Yes, you can use OS/2 for Windows, even without Windows 3.1. Install OS/2 for Windows, choosing to format or not to format the partition as you desire. The only caveat to this is that Windows applications will not run on this system. DOS applications, however, will run if you chose to install DOS application support.

I want to install OS/2 for Windows but add the support for Windows applications later - I'm not sure if I need this facility yet. Can I do this?

This configuration is not a problem as long as you understand several basic facts:

1. Windows support under OS/2 for Windows can only be installed if Windows 3.1 is on the hard disk.
2. Windows 3.1 will NOT install under OS/2. The system must be booted under DOS in order to install Windows 3.1.
3. DOS cannot see nor access HPFS partitions.

The idea here is that Windows 3.1 must be on the hard disk to tell OS/2 for Windows to install Windows support. Therefore, DOS is needed to install Windows 3.1 on the hard disk. If the OS/2 for Windows system was created HPFS only, then this will not be possible, since DOS cannot access HPFS partitions.

Will Windows VxDs (Virtual Device Drivers) run on OS/2 for Windows?

No, they won't. OS/2 for Windows will not run applications requiring VxDs in Windows running under OS/2. However, since OS/2 for Windows creates by default, a dual-boot system where you can boot to DOS and Windows, those applications requiring VxDs can run in that environment if you have set it up that way.

What applications will run under OS/2 for Windows?

If you install the Windows application support under OS/2 for Windows, then any application (DOS, Windows or OS/2) that runs under OS/2 2.1 will run on OS/2 2.1 for Windows.

I have Windows 3.1. It was installed from a CD-ROM. When I install OS/2 for Windows, it tries to find disk 7 on the CD. It is not there. How can I fix this?

There are three possibilities to fixing this situation:

1. Obtain a Windows 5.25" diskette 7.
2. Install Windows 3.1 from a floppy disk. Then use the floppies during OS/2 for Windows installation.
3. Create a "fake" diskette 7. This can be done as follows:
   a. Format a blank 5.25 inch diskette.
   b. Use the LABEL program to label it DISK7, according to the Microsoft Windows diskette labels.
   c. Copy the files from diskette six from the CD to this diskette and use it when the installation program asks for diskette 7.

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Acknowledgement

This article is based on an IBM paper entitled "Frequently Asked Questions About OS/2 for Windows" by David Reich. Note that IBM's level of marketing activity for OS/2 for Windows varies, and in some countries it is not widely advertised. Your dealer should be able to obtain copies if you want them.